REMARKS

Reconsideration and allowance of the present application are respectfully requested.

Claims 1, 8, 9 and 11-14, 16 and 17 are pending in this application. Claims 3-7, 10, 15 and 18-20 have been cancelled. Claim 1 has been amended by essentially incorporating the subject matter of claim 10 and as further supported in the present specification including at page 11, lines 12-14. No new matter has been added.

The applicants respectfully traverse the rejection of claims 1, 8-14 and 16-17 under 35 USC 103(a) in view of Kaneko et al. taken in view of JP 2000-263926 A.

The cited references do not make the presently claimed invention to be obvious.

Before addressing the single prior art rejection in the Office Action, the applicants provide the following comments which are believed to be helpful in further explaining the claimed invention.

The present invention relates to a process for preparing an ink-jet recording material having a photo-like glossiness and the feel of a material (a feel of touching) similar to photography and causing no head rubbing at the time of printing (a phenomenon of contacting an ink-jet head with a recording sheet).

In the course of industrially producing an ink-jet recording material, a support that is wound into a jumbo roll is previously prepared and a coating solution for providing an ink-receptive layer is successively coated onto the support.

For successively coating a coating solution onto the support wound into a jumbo roll and then drying the same, it is generally known to stably transfer the support between a supply roll of the support and a winding roll of the same by enforcing a certain degree of tension to the support.

In order to obtain a photo-like glossiness and the feel of a material (a feel of touching) similar to photography, the ink-jet recording material of the present invention uses a polyolefin resin-coated paper as support.

The ink-receptive layer contains inorganic fine particles having an average primary particle size of 30 nm or less in an amount of 8 g/m^2 or more and a hydrophilic binder, which gives a photo-like glossiness and high ink absorption properties. The polyolefin resin-coated paper support itself does not absorb ink unlike a non-waterproof support such as paper. So, an ink-receptive layer is required to absorb a large amount of ink and is accordingly designed to contain a large amount of a pigment (inorganic fine particles) to absorb the ink as disclosed on page 2, line 32 to page 3, line 6 of the present specification.

However, when such an ink-jet recording material (in which an ink-receptive layer contains a large amount of a pigment (inorganic fine particles)) is industrially produced, a curl toward the direction of the printed surface side is generated due to shrinkage of the ink-receptive layer by drying. As a result, head rubbing is caused at the time of printing with a printer. This is because the polyolefin resin-coated paper hardly absorbs moisture due to its water-resistance property and the degree of its shrinkage is extremely low, while the ink-receptive layer containing the inorganic fine particles and the hydrophilic binder shrinks by drying in the drying step after the coating step.

The smaller the primary particle size of the inorganic fine particles, the more likely the shrinkage of the ink-receptive layer by drying, as discussed above, is to occur (see page 9, lines 32 to 35 of the present specification). Further, with an increased amount of inorganic fine particles having smaller primary particle size, the degree of the shrinkage by drying also increases.

Thus, claim 1 has been amended by reciting the amount of the inorganic fine particles, to further clarify the feature of the ink-jet recording material in which the plus-curl is caused due to shrinkage of the ink-receptive layer by drying.

For the above reasons, when such an ink-receptive layer is coated onto the polyolefin resin-coated paper support and is then dried, the influence of the shrinkage of the ink-receptive layer by drying is exhibited as a plus curl toward the direction of the side to which the ink-receptive layer is coated with a curl axis of the direction where a certain tension is not provided on the support, i.e., the flowing direction at the time of coating the ink-receptive layer and this is a problem alleviated by the presently claimed invention.

Additionally, when the recording sheet is cut according to the conventional cutting method by generally cutting in a longitudinal direction of the recording sheet in the same flowing direction of the ink-receptive layer at the time of coating, curl is further caused under low humidity condition as well as causing head rubbing (see page 7, lines 15 to 20 of the present specification). This is also a problem alleviated by the presently claimed invention.

The presently claimed invention is to solve the above-mentioned problems by cutting, before printing with a printer, the ink-jet recording material so that a longitudinal direction of the ink-jet recording material is at a right angle to a flowing direction of the recording material at a time of coating the ink-receptive layer.

Turning now to the references relied upon in the prior art rejection, Kaneko et al. (US 2001/0014381) discloses an ink-jet recording material having at least one ink-receptive layer provided on a water-resistance support, wherein the ink-receptive layer contains inorganic fine particles having an average primary particle size of 30 nm or less and a hydrophilic binder (see paragraphs [0009] and [0011] of reference).

The Office Action states in paragraph 5, that Kaneko et al. discloses an ink-receptive layer containing inorganic fine particles having an average primary size of 30 nm or less and a hydrophilic binder in paragraph [0011] of the reference and discloses a water-resistant polyolefin resin-coated paper support as a support in paragraph [0124] of the same.

However, the applicants point out that it is conventionally known that an ink-receptive layer mainly comprising inorganic fine particles and a hydrophilic binder is coated on a water resistant support such as a polyolefin resin-coated paper as described at page 2, lines 23 to 30 of the present specification and the presently claimed invention distinguishes from this known process.

Thus, the disclosure of Kaneko et al. relates to an ink-jet recording material having the problems to be solved as in the present application. However, Kaneko only discloses an object and effects of providing an ink-jet recording material which has photo-like high gloss and high ink-absorption property. Kaneko does not disclose and thus does not suggest a remedy for handling the ink-jet recording material under low humidity condition with problems, discussed above, of the plus curl toward the direction of the side to which the ink-receptive layer is coated with a curl axis in the flowing direction at the time of coating the ink-receptive layer in the course of industrially producing the ink-jet recording material. The presently claimed process addresses these problems and distinguishes over Kaneko et al.

The applicants submit that the teachings of JP 2000-263926 (JP '926) do not remedy the deficiencies of Kaneko et al. JP '926 is discussed at page 4, line 2 of the present specification as background art and is well known to the present inventors.

The disclosure of JP '926 relates to an ink-jet recording material having surface glossiness and excellence in ink-jet recording suitability and printer traveling

property. JP '926 discloses a the ink-jet recording material which comprises an undercoating layer provided as needed on a paper support and a gloss layer further provided as a top coat, a thickness of the entire sheet is 100 to 300 μm, stiffness of a printer sheet passing direction is 200 to 1,000 mgf, and the ink-jet recording material is so cut that the printer's paper feed direction is perpendicular to the flow direction of the paper support at the time of papermaking process (see claim 1 of reference). An object of JP '926 (and the effects obtained by the same) are to improve faults in paper transport such as transport of multiple papers and the lack of paper transport due to cockling and the like which are caused by a glossiness layer being provided onto a surface of the recording material by cast process.

Contrary to the Office Action, the applicants assert that it would not have been obvious to person of ordinary skill in the art to have cut Kaneko et al.'s recording material product according to the cutting manner as disclosed in JP '926.

The applicants submit that there is no suggestion, motivation or reason to try to combine the teachings of Kaneko et al. with those of JP '926, to result in the presently claimed invention.

The ink-jet recording material as disclosed in JP '926 uses a paper support as a support significantly different from the ink-jet recording material of the presently claimed invention which uses a water-resistance support. JP '926 discloses in paragraph [0014] that the stiffness of the paper web in MD direction (the flowing direction at the time of papermaking of the paper support) is higher compared to the stiffness in cross direction (the direction at a right angle to the flowing direction at the time of papermaking of the paper support). Thus, the finding of JP '926 is to accomplish the above-mentioned object by the combination of requirements as defined in claim 1 of JP '926: i.e., the stiffness in paper feed direction; thickness of

the sheet; and the cutting of sheet in CD direction by relying upon the fact that the stiffness of the paper web in machine direction (MD) is higher compared to the stiffness in cross direction.

Unlike JP -926, however, the recording materials of the presently claimed invention include a support in which the base paper is not coated with polyethylene resin. In contrast to the presently claimed invention, the materials of Comparative Examples G and H shown in Table 1 on page 29 of the present specification caused head rubbing whether the cutting directions as shown in Figure 1 or shown in Figure 2 (further see page 29, line 10 to page 30, line 3 of the present specification). Thus, in the case of the recording material which uses a paper support in the presently claimed invention, head rubbing cannot be improved whether the CD cutting direction or the MD cutting direction.

Further, an object of the present invention (and effects obtained by the same) are found in the case of using a support which is inherently water resistant. The present specification discloses (see page 17, lines 11 to 19) as a water-resistance support, a number of plastic resin films typified by polyethylene telephtalate in addition to the polyolefin resin coated paper.

According to the above, a person of ordinary skill in the art would understand that in contradistinction to JP '926, the presently claimed invention does not rely upon the stiffness of the paper web in machine direction (MD) being higher compared to the stiffness in cross direction.

The applicants also note that the paper support disclosed in JP '926, shrinks by drying unlike the polyolefin resin coated paper used in the presently claimed process. When a coating solution is coated onto the paper support, the paper support absorbs moisture in the coating solution and at the time of drying, the paper

support shrinks toward minus curl direction, while the ink-receptive layer shrinks toward plus curl direction. Thus, plus curl toward the direction of the printed surface side is decreased when using a paper support as compared to when using a polyolefin resin coated paper. Also, all of the evaluation tests in the working examples of JP '926 were carried out under conditions at 20° C and 65 % RH (see paragraph [0038] of reference). Thus, JP '926 does not disclose the problem of plus curl under low humidity condition and head rubbing.

Accordingly, JP '926 never discloses the problems of plus curl due to shrinking by drying and of head rubbing.

In addition, the ink-jet recording material as disclosed in JP '926, is a cast paper for ink-jet recording, which is significantly different from the ink-jet recording material of the presently claimed invention.

Support for the ink-jet recording material of JP '926 being a cast paper is apparent from the description at paragraph [0027] and from the working examples of the reference. In the working examples, both of the ink-jet recording sheets A and B were prepared in accordance with the cast process wherein the coated layer is attached with pressure to a heated mirror surface drum (see paragraphs [0032] and [0033] of JP'926).

In the case of a water-resistance support such as polyolefin resin coated paper as disclosed in Kaneko et al., the ink-jet recording material can not be prepared by a cast process. This is because, when the coated film in a wet state is attached to a heated mirror surface drum with pressure, the moisture in the coated film cannot pass through the water-resistance support and remains in place thereby causing blisters. Thus, a ink-jet recording material having high surface glossiness and ink-jet recording suitably cannot be obtained. Instead, the ink-jet recording

material itself cannot be prepared.

Accordingly, the applicants submit that a person of ordinary skill in the art would find no motivation to combine the teachings of Kaneko et al. with those of JP '926 to result in the presently claimed invention. The applicants assert that the combination is untenable and should be withdrawn.

While multiple reasons are proved above, at the very least there is no motivation for combining Kaneko et al. in which the recording material uses polyolefin resin coated paper as a support and JP'926 in which the recording material is obtained by cast process.

The applicants submit that the presently claimed invention is fully allowable under Section 103(a) in view of the cited references.

In view of the above, the applicants submit that this application is in condition for allowance and a Notice to that effect is respectfully requested.

Respectfully submitted,

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